

APPENDIX C-3

MASTER DRILLING PROGRAM

OPERATOR: Petroleum Development Corporation (Pedco)

Carbon County, Wyoming

Sections 8 & 17 T16N, R91W, 6th PM

BLM Leases: WYW116679, WYW126439

Drilling Program for the subject wells listed below:

1. Federal 1691-10-8X
2. Federal 1691-8-17

1. AVERAGE ESTIMATED TOPS OF IMPORTANT GEOLOGIC MARKERS:

Formation	Depth
Lewis Shale	Surface
Almond	+/- 580'
Pine Ridge	+/- 1010'
Allen Ridge	+/- 1174'
TD	+/- 1400'

2. ESTIMATED DEPTH OF ANTICIPATED WATER, OIL, GAS OR MINERAL FORMATIONS:

Almond	Methane gas
Allen Ridge	Methane gas

The Lewis Shale is not anticipated to contain any zones capable of producing water. There are several zones within the Mesaverde capable of producing fresh water, including the coal seams. Several coal seams may be tested for gas producing formations to total depth. All shallow water zones will be protected with casing and cement. Cement will be brought above the base of the Lewis Shale to isolate all formations in the Mesaverde Group.

Planned Objective: Mesaverde

3. MINIMUM BOP REQUIREMENTS: - refer to attached BOP schematics

1. The BOPE shall be closed whenever the well is unattended.
2. The BOPE shall be pressure tested when initially installed, whenever any seal subject to pressure testing is broken, after repairs, or every 30 days.
3. PEDCO shall notify the Rawlins BLM office 4 hours prior to the BOPE test.

4. SUPPLEMENTARY INFORMATION:

The primary objective of this project is to drill, stimulate, and produce coalbed methane gas from the coal seams of the Mesaverde Formation.

PEDCO proposes to test the Mesaverde coals between 580' and 1400'. Stimulation of the perforated coal seams will be done by hydraulic fracturing. Fresh water, gelled water, and/or foam fracturing techniques will be used.

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Please see the attached schematics for **Typical CBM Drill Site Layout, Configuration Options, Typical CBM Completed Well, and Typical CBM Well Site.**

5. CASING PROGRAM:

<u>Hole Size</u>	<u>Casing Size</u>	<u>Casing Wt.</u>	<u>Grade</u>	<u>Joint</u>	<u>Depth Set</u>	<u>New/Used</u>	<u>Rng</u>
13 1/2"	10 3/4"	32.75#	H-40	ST&C	0-140	New	3
9 7/8"	7"	17#	H-40	LT&C	0-TD	New	3
Surface Casing:		10 3/4"	32.75 ppf.	H-40	STC	Collapse	Burst
					Ratings:	880	1820
							Tension 205M

A. Burst = $[0.052 * FG * TVD(shoe)] - [Gas Gradient * TVD]$
 $= [0.052 * 9.3ppg * 140'] - [0.1psi/ft * 140']$
 $= 53.7psi$
 Safety Factor = Rating/Burst
 $= 1820/53.7$
 $= 33.89$

B. Collapse = $0.052 * MW * TVD(shoe)$
 $= 0.052 * 8.8ppg * 140'$
 $= 64.06psi$
 Safety Factor = Rating/Collapse
 $= 880/64.06$
 $= 13.74$

C. Tension = $Weight * MD * [1 - (MW/65.5ppg)]$
 $= 32.75ppf * 140' * [1 - (8.8ppg/65.5ppg)]$
 $= 3988.95 lbs.$
 Safety Factor = Rating/Tension
 $= 205,000/3988.95$
 $= 51.39$

Surface casing shall have centralizers on the bottom 3 joints of the casing, starting with the shoe joint.

Production Casing:	7"	17 ppf.	H-40	STC	Collapse	Burst	Tension
					Ratings:	1450	2310
							122M

A. Burst = $[0.052 * 8.4ppg * 1400'] - [0.1psi/ft * 1400']$
 $= 471.52psi$
 Safety Factor = Rating/Burst
 $= 2310/471.52$
 $= 4.89$

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B. Collapse = $0.052 * 12.5\text{ppg} * 1400'$
= 910psi
Safety Factor = Rating/Collapse
= $1450/910$
= 1.59

C. Tension weight = $17\text{lbs./ft} * 1400' * [1 - (12.5\text{ppg}/65.5\text{ppg})]$
= $17\text{lbs./ft} * 1400' * .8092$
= 19,259 lbs.
Safety Factor = Rating/Tension
= $122,000/19,259$
= 6.33

6. MUD PROGRAM:

Drilling mud will be used by the circulation medium. A fresh water, polymer, gel drilling mud will be used and visual monitoring will be done from spud to total depth. The anticipated mud weight will be between 8.5 – 13 ppg. Sufficient quantities of lost circulation material and barite will be available at the well site at all times for the purpose of assuring well control.

7. CEMENTING PROGRAM:

The following is the proposed procedure for cementing the 10 3/4" surface pipe and 7" long string:

Surface Casing:

Lead: Class "C" Type III, 14.4 ppg., yield 1.44ft³/sk @ 101% excess. Compressive strength in 24 hours at 80°F 3100psi.

The surface casing shall be cemented back to surface. In the event cement does not circulate to surface or fall back of the cement column occurs, remedial cementing shall be done to cement the casing back to surface.

Long String:

Lead: Class "C" Type III, 14.4 ppg., yield 1.44ft³/sk @ 35% excess. Compressive strength in 24 hours at 95°F 3200psi.

Estimated top of cement back to surface.

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8. LOGGING PROGRAM:

Cores: Rotary Cores will be taken as needed to evaluate the coal seams.

DST's: None Planned

Logs: Induction, GR, SP, Density, Neutron and Caliper – From surface to TD
Cement Bond Log – From 10 $\frac{3}{4}$ " casing shoe TD
Mud Logger – As Needed.

9. PRESSURE DATA, POTENTIAL HAZARDS:

Bottom hole pressures anticipated @ 1000 – 1100 psi.

There is no history of hydrogen sulfide gas in the area and none is anticipated.

10. ANTICIPATED STARTING DATES AND NOTIFICATION OF OPERATIONS:

A. Anticipated Starting Dates:

Anticipated Commencement Date	- Summer 2001, or upon approval
Drilling Days	- Approximately 7 Days/Per Well
Completion Days	- Approximately 2 Days/Per Well
Testing Days	- Approximately 7-14 Days/Per Well

Note: Drilling operations will commence as soon as practical after approval of all necessary permits including the APD's.

B. Notification of Operations:

Rawlins Field Office, BLM
1300 North Third
Rawlins, Wyoming 82301
(307) 328-4200



SHAFER HYDRAULIC BLOWOUT PREVENTERS TYPE E DOUBLE PREVENTERS (RISING LOCKING SHAFTS)

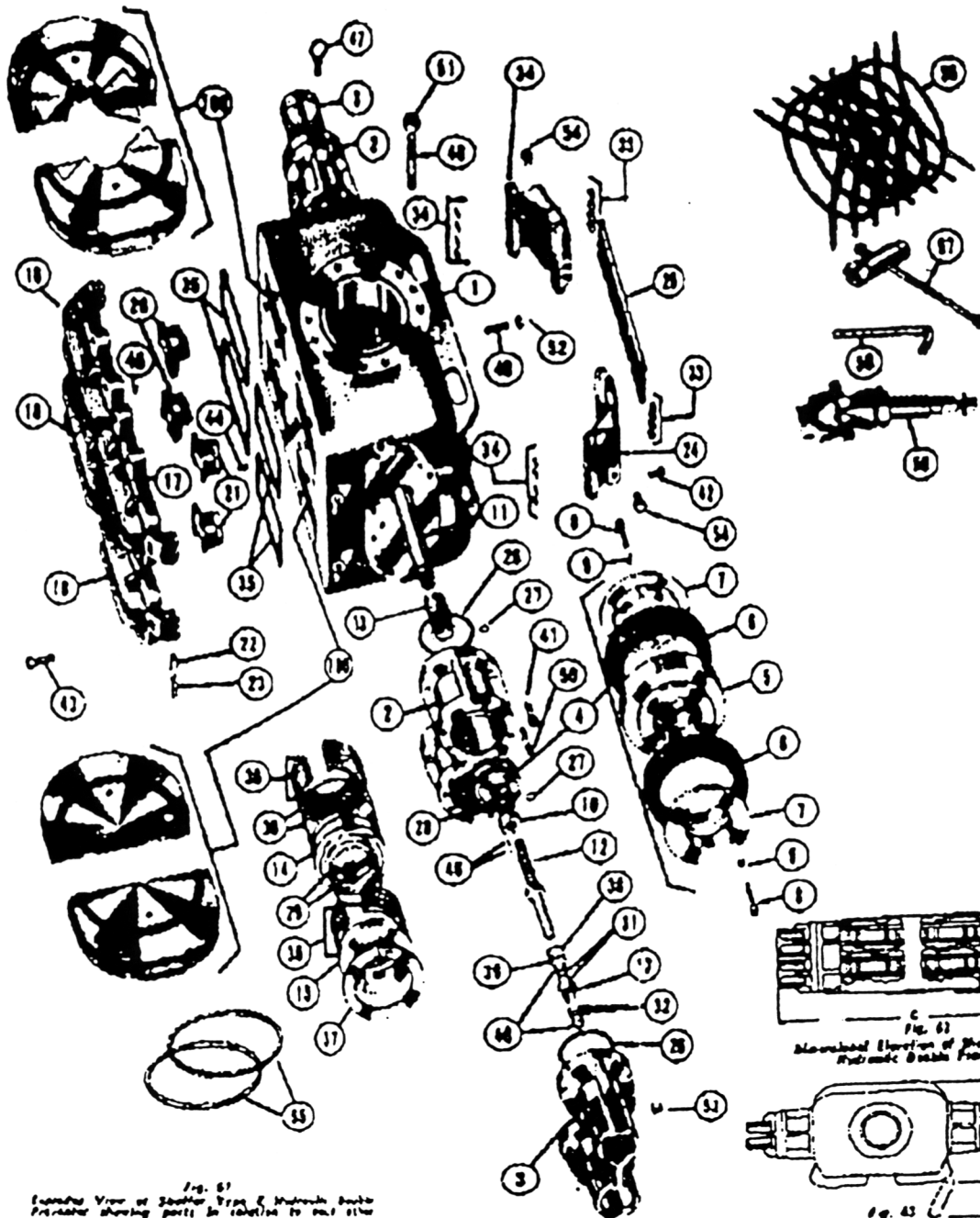


Fig. 61
Exploded View of Shaffer Type E Hydraulic Double Preventer showing parts in relation to each other

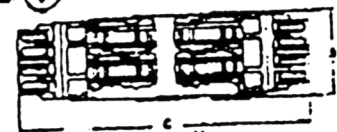


Fig. 62
Cross-sectional View of Shaffer Type E Hydraulic Double Preventer

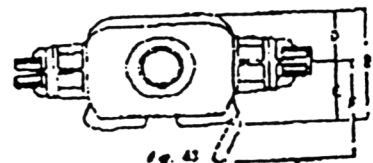


Fig. 63
Frontal View of Shaffer Type E Hydraulic Double Preventer

Size Press. Rat Test Press Vertical bore
10" 3,000 psi 6,000 psi 11"

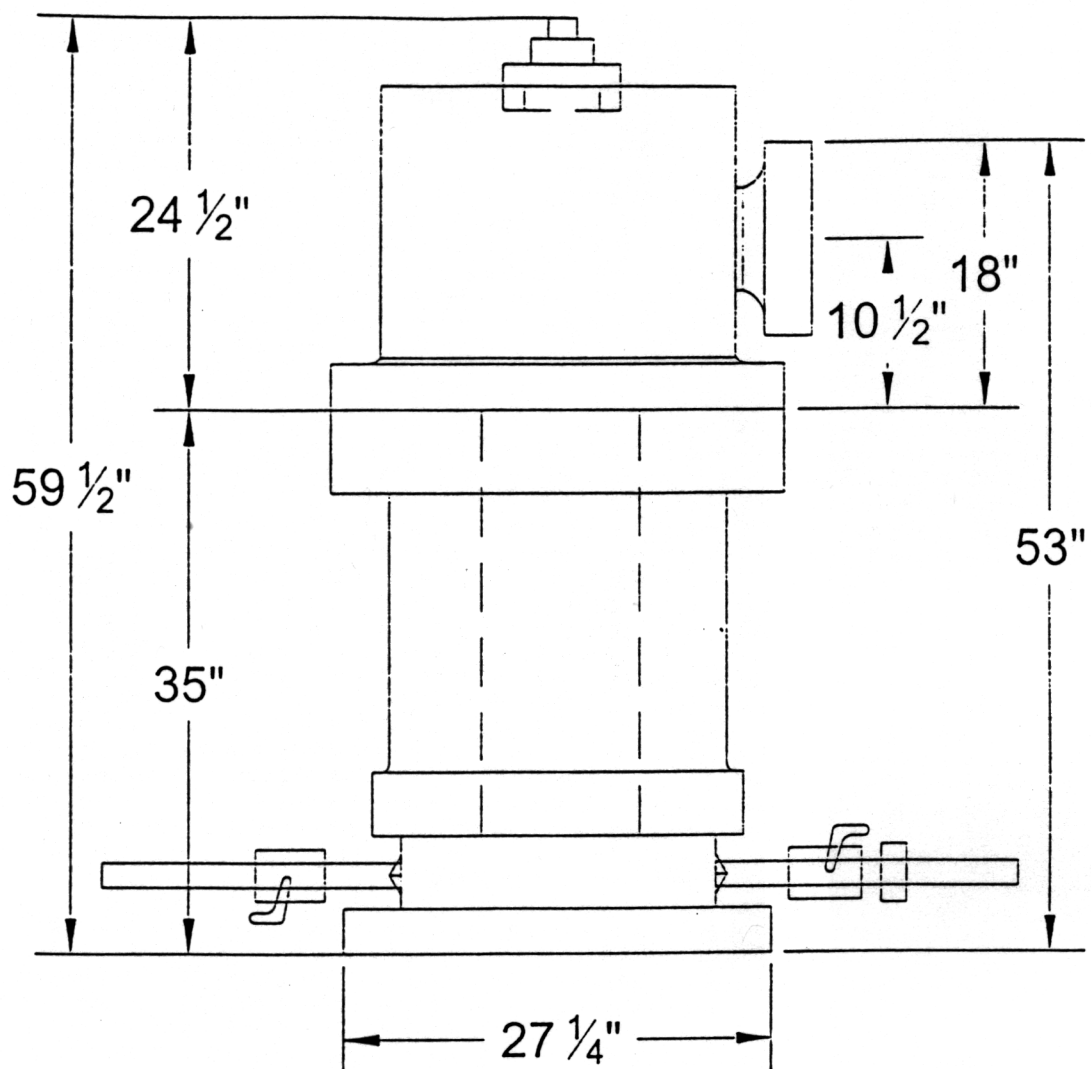
Height
27 1/2"

width
34 1/4"

Length
80 1/8"



close
3.25 gals

open
2.79 gals

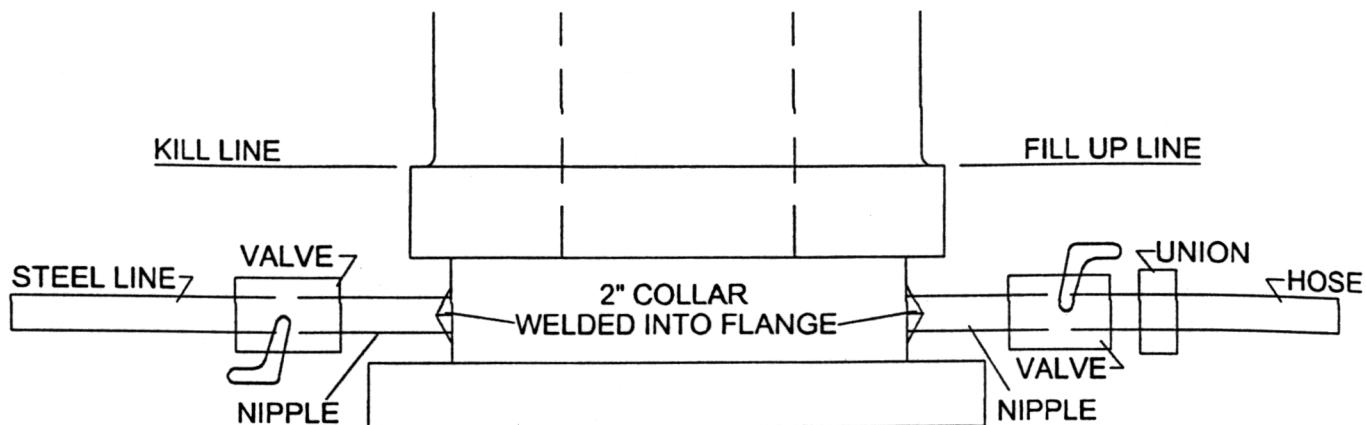


SPECIFICATIONS

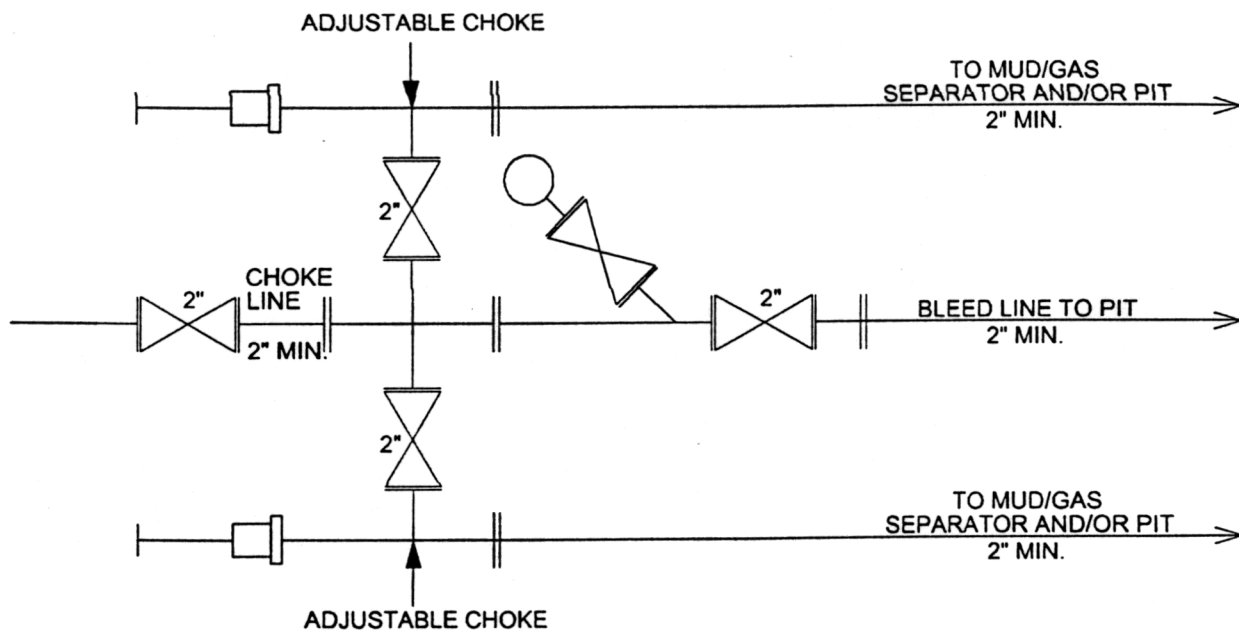
- 10" - 900 FLANGES ON B.O.P.
- 10" - 900 FLANGE ON ROTATING HEAD
- 6" - 600 FLANGE ON FLOWLINE
- 2" - COLLAR ON EACH SIDE OF B.O.P. AT BOTTOM

 PETROLUUM DEVELOPMENT CORP. 	
SCHEMATIC	
1500 P.S.I. REAGAN ANNULAR B.O.P.	
SCALE: AS NOTED	DATE: 05 04 01
DRAWN BY: MTM	FIGURE: 1

BOTTOM FLANGE ON ANNULAR B.O.P.





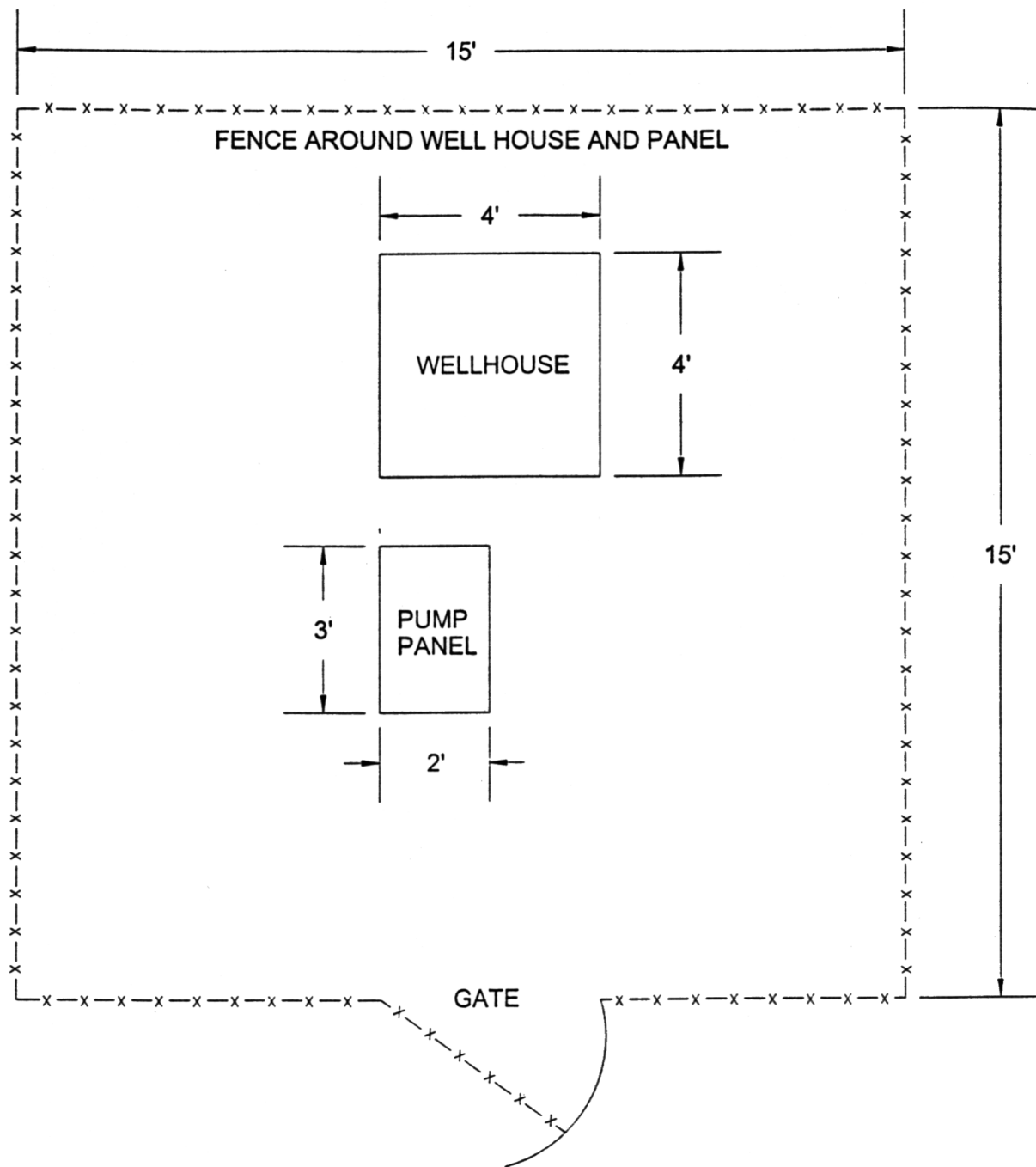
2M CHOKE MANIFOLD EQUIPMENT



SPECIFICATIONS

- 10" - 900 FLANGES ON B.O.P.
- 10" - 900 FLANGES ON ROTATING HEAD
- 6" - 600 FLANGE ON FLOWLINE
- 2" - COLLAR ON EACH SIDE OF B.O.P. AT BOTTOM

 PETROLEUM DEVELOPMENT CORP. 			
SCHEMATIC			
BOTTOM FLANGE ON ANNULAR B.O.P. & 2M CHOKE MANIFOLD EQUIPMENT			
SCALE: as noted	DATE: 05.04.01	DRAWN BY: MTM	FIGURE: 2



PETROLUUM DEVELOPMENT CORP.



TYPICAL CBM WELL SITE

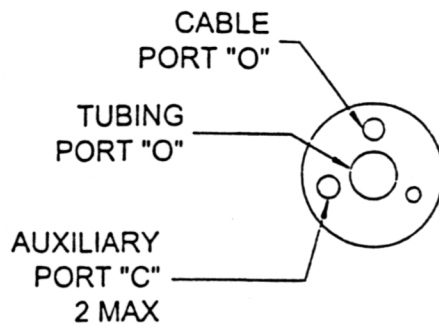
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DATE: 05.04.01

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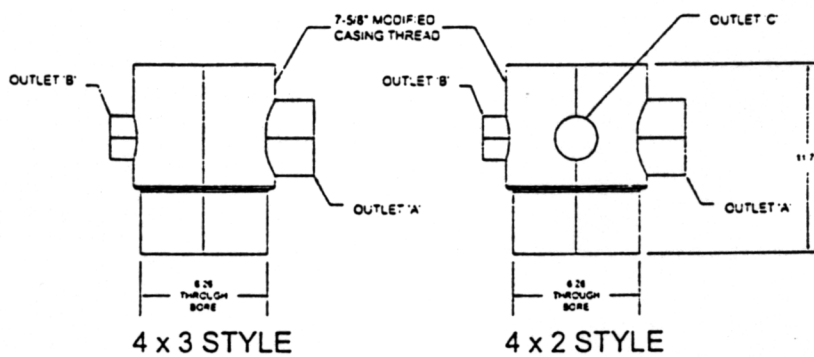
FIGURE: 5

MANDREL STYLE



GS-3 / GS-4
CENTERED HANGER
WITH CABLE PORT &
UP TO 2 AUX PORTS

BODY STYLES



Standard Body Configurations				
Body Style	Bottom Connection	Outlet "A"	Outlet "B"	Outlet "C"
4 x 2	7" Short Casing (Male or Female)	4" LP Female	2" LP Female	NA
4 x 3	7" Short Casing (Male or Female)	4" LP Female	3" LP Female	NA
4 x 2 x 2	7" Short Casing (Male or Female)	4" LP Female	2" LP Female	2" LP Female

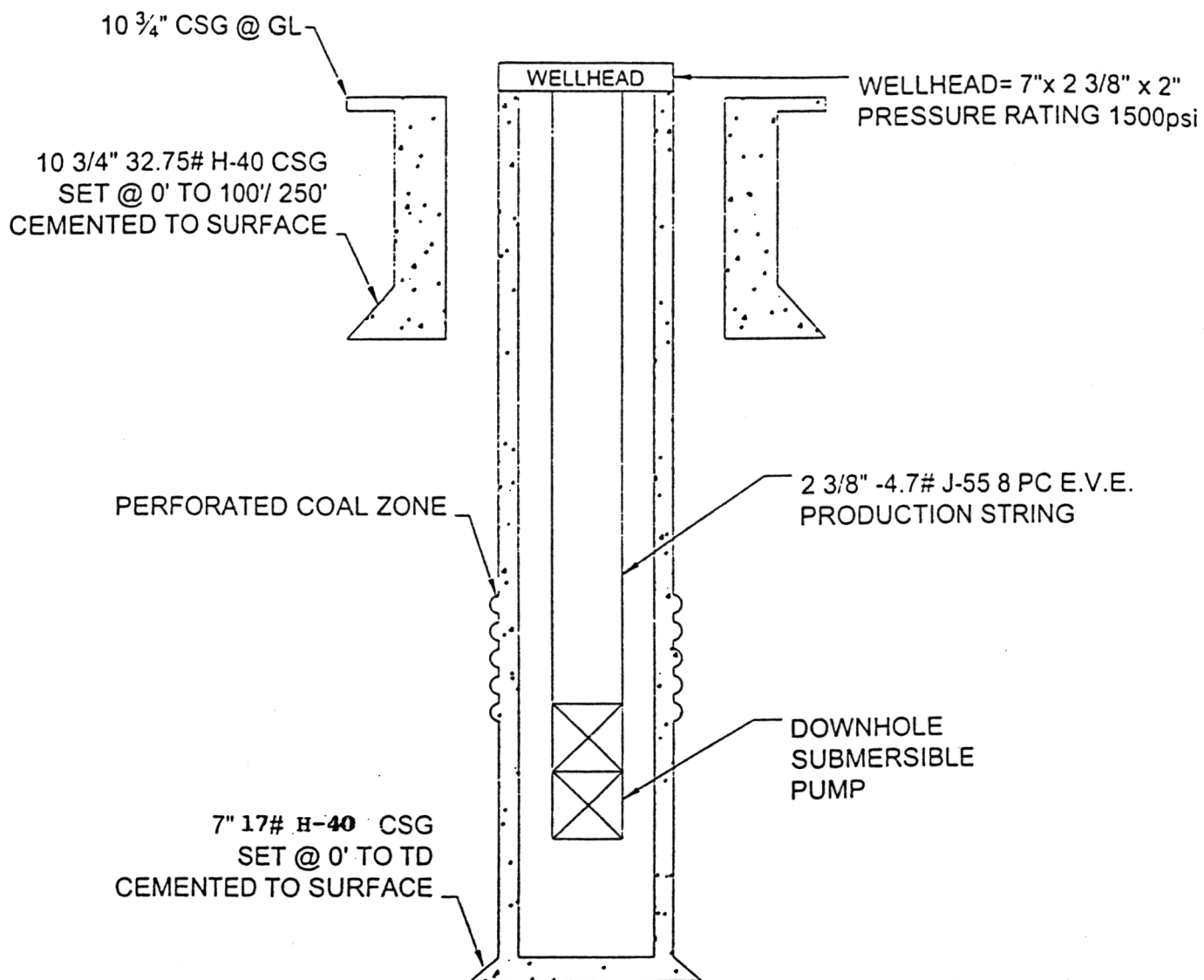
Standard Mandrel Configurations				
Mandrel Style	Port "C"	Port "D"	Port "E"	Approx Wt - LBS
GS-3	2-3/8" UPTBG Box Down X	1" LP	(1) 1/2" LP Box Up	26
GS-4	2-3/8" UPTBG Box Up	Box Up	(2) 1/2" LP Box Up	26



PETROLUEM DEVELOPMENT CORP.



CONFIGURATION OPTIONS



PETROLEUM DEVELOPMENT CORP.



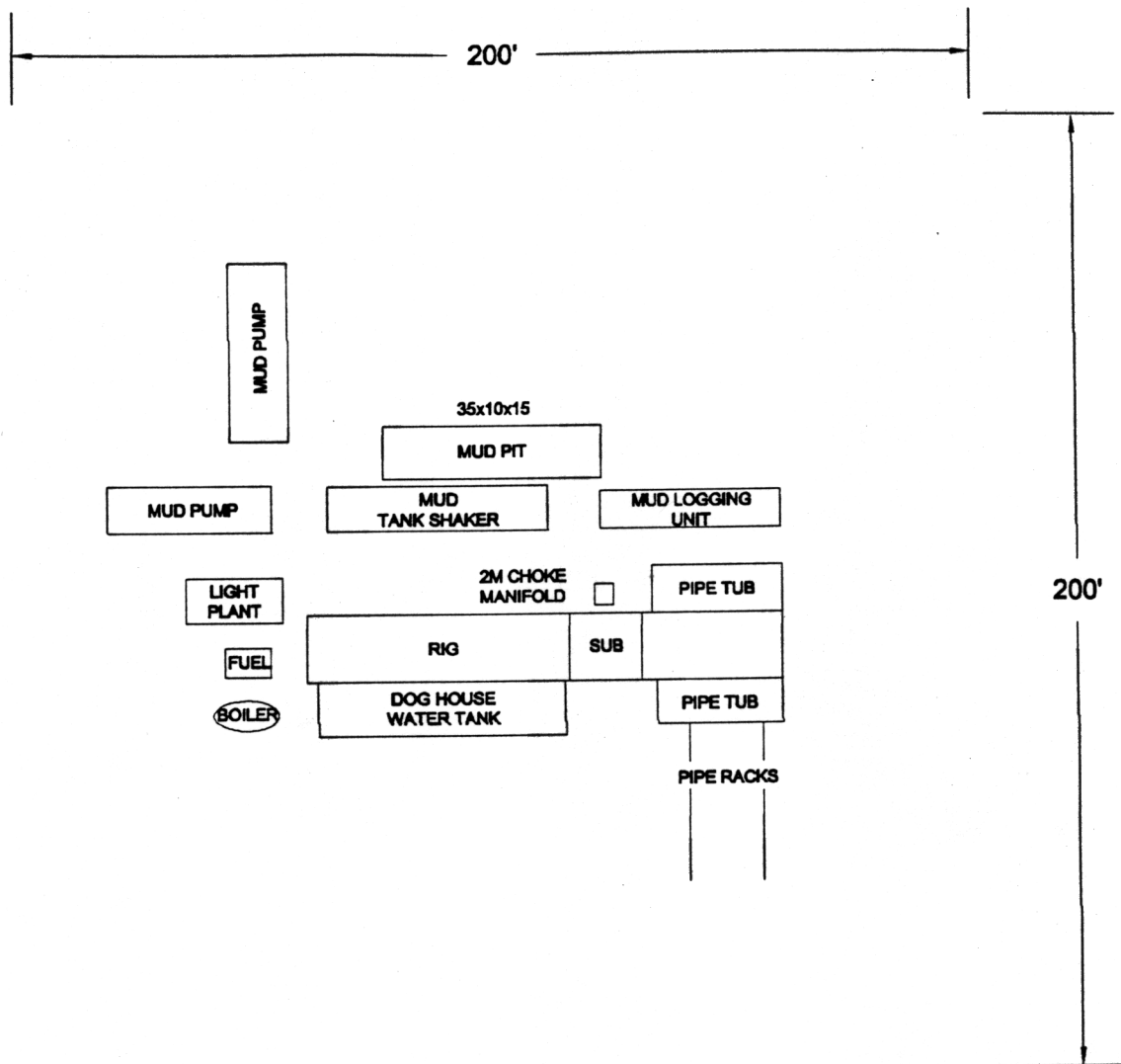
TYPICAL CBM COMPLETED WELL

SCALE: NTS

DATE: 05.04.01

DRAWN BY: MTM

FIGURE: 4



PETROLUEM DEVELOPMENT CORP.



TYPICAL DRILLSITE LAYOUT

SCALE: NTS

DATE: 5.18.01

DRAWN BY: ML

FIGURE: -